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THE GREAT PLAINS IN THEIR RELATION TO HUMAN OCCUPATION AND DEVELOPMENT

A SERIES OF LESSONS FOR SEVENTH OR EIGHTH GRADE

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THE REGION DESCRIBED—from U. S. G. S. Professional Paper No. 32. The Great Plains are rolling tablelands extending from the foot of the Rocky Mountains eastward to the valley of the Mississippi, and traversed by broad shallow valleys of large rivers rising mainly in the Rockies. Smooth surfaces are the characteristic feature, but in portions there are buttes, badlands, and wide districts of sand hills. The Great Plains descend from an altitude of 6000 feet at the foot of the Rockies to 1000 feet near the Mississippi, having an average fall of ten feet to the mile. The underlying rocks are beds of sands, clays, and loams sloping gently eastward. This material was derived from the mountains west and was deposited layer by layer during earlier times in the sea, and later by streams on their flood plains or in lakes. Many of the streams in time of freshet bring down a greater load than they can carry and their valleys are now being built up rather than deepened.

Part of the surface water passes into the sandstones along the foot of the Rocky Mountains, and flows east through the porous rocks, finally escaping in springs in lower levels. Where the coarse water bearing strata are overlaid by a thick mass of impermeable strata they are under great pressure, for they have flowed from an altitude of 4000—6000 feet to the region of outflow at 1000—2000 feet. Many wells of South Dakota show a pressure of 175 lbs. to the square inch. Over a thousand wells have been sunk east of the Missouri River and they yield a large supply daily. Sometimes wells are bored to a great depth and even then a good and abundant supply is not obtainable. The Denver and Rio Grande Railroad made a boring of 2,030 feet, but did not find a sufficient supply of good water. In the vicinity of the Arkansas River good water may generally be obtained.

CLIMATE

The rainfall varies considerably, precipitation growing less from east to west. To the east there are 40 inches of rainfall per year, while to the

west near the Rockies there are less than 12 inches over a considerable area. To the east there is sufficient rainfall for crops, and that region is one of the great corn and wheat producing areas of the world, while to the west no crops are raised without irrigation. Evaporation also increases from east to west, and the large amount in the arid region is a serious factor in the storage of water for irrigation. The mean annual temperature increases from north to south, also in ascending the mountain slopes. The region receives more or less snow in winter, the amount diminishing in the arid plains westward and increasing on the high mountains . On the western plains owing to the clearness of the air, the sun's heat is more intense during the day than in the region eastward. For the same reason the nights are cooler, and in general the heat less oppressive.

See also—Account of Expedition of Major Stephen H. Long from Pittsburg to the Rocky Mountains—1819-1820.

North Dakota Life: Plant, Animal, and Human, Wallace Craig-Bull, A. G. Soc. vol. xi, No. 6.

EQUIPMENT FOR CLASS WORK.—Wall Map of United States showing physical and political features. Historical map of United States showing acquisitions of territory. Text-books and Geographical Readers used by pupils. McMaster's School History of United States.

LESSON OUTLINE. Discussion of points to be made and assignments for home lessons.

The Great Plains were once known as The Great American Desert; but to-day it is a source of great wealth, and millions of people depend upon its products for food and clothing. We purpose to find out how it came to be thought a desert, and by what means large portions have been changed to areas of great productiveness.

Where are the Great Plains?

Use rainfall map of United States to fix idea that eastern boundary is climatic. The irregular line denoting 20 inches and more of rainfall per year marks the eastern boundary. The most arid portion lies between the 100th meridian and the Rocky Mountains.

How did this region come into possession of the United States?

Pupils will recall Louisiana Purchase.

Towns already settled were St. Louis and New Orleans; west of Mississippi was practically unknown. Jefferson thought it wise to find out about new territory. (McMaster's School History has an interesting paragraph, p. 219, about the general ignorance of the government about the region.)

What means did the government take to learn about this territory?

Pupils will recall Lewis and Clarke's expedition, Pikes, Long's. (McMaster, p. 330 gives routes of these explorers.)

Major Long kept an interesting diary of his expedition.

Would Long's journey be pleasant, easy? What were some of the difficulties he would have to face?

Discuss the general surface of the country, its aridity. Pupils will suggest hardships from scarcity of food and water and dangers from Indians.

Long walked for 150 miles up the bed of the Arkansas river without once seeing water. What season? Curiosity will be aroused as to what had become of the waters that flowed from mountains. If no solution is offered by pupils, leave question unanswered for the present.

In portions of the stream lower down he found water holes used by buffaloes as drinking pools, but these were often muddy and water not fit to drink. He dug in the bed of the stream for water, often it was salty. He saw prairie dogs, and birds, but game was not abundant. Why? He finally reached the Rockies. *What record do we find on the map of the accomplishment of his journey? of Pike's expedition? of Lewis and Clarke's?*

What was likely to be the nature of the report Long sent to the U. S. government?

(McMaster, p. 331 gives a summary of Long's report.) This report gave rise to name "Great American Desert."

How would such a report affect the settlement of the region?

No attempts were made for many years to settle the territory. When gold was discovered in California and trails were blazed across this "desert" and the Rockies, the "Plains" was the most dreaded part of the journey. Why?

At this juncture call for a summary of points made. Group the facts into headings on the board. Discuss assignment for home study with class. It may well be a lesson in location with a record of the most important facts learned.

A report of the work done outside should precede the advance work of the next lesson. Call upon a member of the class to point out on the wall map all the features recorded on his own map. This report should either be accepted or challenged by the class. This review should be thorough.

II. *Why did the routes of all these explorers and emigrants follow rivers?*

Of the rivers the Arkansas is perhaps the most interesting and typical of a "Plains" stream, and through a study of it we shall find an answer to our question,—How has this desert area been changed to one of great productiveness?

The Arkansas River is often called The American Nile. *Judging from this name, what must be some of its characteristics?*

Shifting sands; wide fertile valley extending for hundreds of miles furnishes sustenance to the people who live on its banks.

Rises where? Fed by what? Where does it emerge from the mountains? How does its character change?

Careful study of map necessary. The Royal Gorge of the Arkansas is used as an illustration in most text-books. The upper portion of the river does not invite to settlement. Why? Where the river emerges on the plains, the agricultural development of the valley begins. The population of eastern Colorado is chiefly in the vicinity of the Arkansas. Why? Irrigating ditches appear west of Pueblo. At Rocky Ford are the melon farms, their product famous all over the United States. *How do the farmers make sure of a bountiful supply of water during the summer? Cattle and sheep appear further eastward.*

How are flocks and herds watered?

The Arkansas a strange river: the water grows less as we advance toward its mouth.

In what part of river's course does this condition begin? Suggest reasons.

The Arkansas is a *two-story* river. Entire stream disappears at times into the sands and reappears many miles below. (Use of diagram will make this clear.) Recall Long's experience. Point to a place on the map where he may have walked in the bed of the river. In March one can often walk across the bed of the river in western Kansas and eastern Colorado. A half-mile of level sand with the narrow ribbon of the stream winding across it is all that lies under the long bridges that span the Arkansas.

When might this narrow stream become a flood?

During May and June when snows on the mountains are melting, sometimes during a cloud burst in summer the river rises suddenly like a tidal wave and becomes a tossing angry flood. Some one has said that the Arkansas is 2000 miles long, half a mile wide, and six inches deep!

Which of these dimensions is constant?

Similar conditions may be found in other countries where streams issue from steep mountains into regions of light rainfall. The Po, fed by melting snows becomes a wide flood of waters in the spring; it must be controlled. How?

The early emigrants who followed the Platte and Arkansas suffered terrible hardships from lack of water. Yet there was water if they had known how to get it.

Where did Long find it? What kind of soil must the stream flow through for this to happen? What should cause the stream to come to the surface again?

Settlers afterward bored for water; sometimes they find it a few feet, sometimes hundreds and thousands below the surface.

How has it been possible to turn this so-called desert into sheep and cattle ranches and melon farms?

Locate the grazing section of the Great Plains.

In the lower portion of the river's course the stream comes permanently to the surface and behaves as a normal river should. (Use rainfall map to determine where this will be.) Here the plains emerge into the prairies and farming is not confined to the river valleys, nor dependent on under ground waters for supply.

In summary be sure pupils bring out these divisions of the river with character of each and relation of occupation to river and water supply.

The home assignment may well be some sort of reproduction of the lesson. Those who like to write may choose one of the headings of the summary, or they may prefer a heading of their own. Discourage attempts at long detailed papers, better a short one with some additional information of interest to the class.

III. The chief points to be brought out in the third step are the occupations and industries of the dwellers on the Plains, and some of the conditions peculiar to the plant and animal life which surround them.

Though ranching is the chief occupation of a large portion of the area yet each year more land is brought under cultivation. The extension of irrigating projects and the introduction of dry farming make this possible. There are no large cities. Pueblo at the western boundary, Wichita at the eastern are two flourishing towns, others are growing. The products of the ranches are shipped east. *To what point in Nebraska? in Missouri? in Illinois?* These products give rise to many industries in these cities beside those connected with meat packing. St. Louis makes shoes, Chicago tans leather, makes harnesses, etc.

What railroad lines cross these states? Which of them follow routes of explorers? Which follows the old Santa Fe trail?

Most people think a journey across the Great Plains monotonous, but a keen observer will find many things to interest him. Trees are found only along water courses, where the river has but a deep valley, the tops of the trees only are seen, level with the surface of the plain; on the vast stretches all plant life appears dwarfed, but roots go down deep reaching for water. Alfalfa roots are reported to have developed a length of 129 feet. Birds which build nests in trees in a forested country here seek shelter in the ground.

The farmer and ranchman look up into a great expanse of sky, see the horizon-circle like the sailor, and can see a great distance because of the flatness and the clear atmosphere. Sunsets are strikingly beautiful, and the moon and the stars brilliant, the aurora flashes during the winter. Many boys and girls who have been brought up on the Plains have never seen a lake or a river, perhaps not even a tree. Our Great Plains are more accessible to the comforts of modern life than the Plain of Hungary, the steppes of Russia, on the plains of Argentina.

SHORT STUDIES ABROAD—THE SEVEN HILLS OF ROME

By W. M. Davis

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(Continued from April.)

Geology and Geography. Let me now return to the Seven Hills of Rome, and ask the question whether they and the landscape around them are better described in explanatory or in empirical fashion: that is, in view of their origin according to the best theories that can be presented, or in terms of immediate observation independent of theory. An old-fashioned teacher of geography—if any such still survive in these modern times—might say, on reading the explanatory account given in the first two paragraphs of this sketch:—"That is not geography; it is geology. Geography is not concerned with past changes, it has only to do with the present. It is enough for me, as a teacher of geography, to know that the Seven Hills are there without being bothered about long antecedent processes of volcanic eruption and river erosion...." There was perhaps a time when such an opinion regarding explanatory geographical descriptions could have been justified; but that was a time when geology was thought to be concerned with a past order of things, so unlike the present geographical order that the two were little related. We are now in a more enlightened period. The past order of terrestrial history has been found to be essentially like the present order. Geology is seen to consist of an endless succession of geographies, and geography is recognized as being only today's geology. The two subjects, once divorced to their mutual disadvantage, are now closely united by the continuity of one into the other, just as ancient and modern history are united. The facts of the present, either in history or in geography, cannot be properly understood unless they are seen to be an inheritance of the past.

Explanatory Descriptions. The teacher of geography who objects to explanatory descriptions as irrelevant is seldom met with today; but a cautiously conservative teacher, hesitating to adopt explanatory methods because of their possible uncertainty, might say:—"It is true enough that things are as they are because of the long continued action of natural processes; but the nature of these processes and the work they have done can be determined only by a vast amount of theorizing; and theorizing, though interesting enough to be sure, is after all so uncertain that I prefer to limit my descriptions to what is directly observed, and to leave the origin of land forms to the speculative science of geology...." It is not to be denied that the explanatory description of land forms does involve abundant theorizing; but there is such a thing as reasonable certainty

in theory as well as in observation; and in the elementary explanations given above regarding the Seven Hills of Rome, the limits of safe theorizing are not transcended. On the other hand, the same cautious and conservative teacher, who objects to the introduction of speculations about changes in river courses brought about by the growth of volcanic cones, will probably not hesitate to use the familiar term, delta, with its supposed but not observed growth by river deposition; or volcano, with its implication of many successive spasmodic eruptions. Why then should not other explanatory terms and phrases, such as calderas apparently formed by engulfment, radial consequent valleys, aggraded intermont basins, and so on, be added to a geographer's equipment, as soon as their meanings are well assured? It would be no more fitting to neglect the scientific progress of the last half century in this respect and to continue in purely empirical geographical descriptions, than to reject the modern method of determining difference of longitude by telegraph, and to persist in the old-fashioned and cumbersome method of chronometer expeditions.

But there are certain hurried teachers, greatly pressed for time, who say:—"These long, roundabout, explanatory descriptions may be true; and if so, they are all well enough for the entertainment or edification of anyone who has time to follow them; but I am too busy to use so indirect a method; I can't stop to learn the origin of things. It serves my practical purposes best to tell at once what the plain facts are, in terms that can be immediately understood by any one...." With teachers of this temperament—if such there be—it is hardly worth while to argue; but it is to be hoped that there are many others of larger patience and broader training, who will recognize that there is no method of description so helpful or so illuminating, as the genetic or explanatory method. It may advance more slowly than other methods at the outset; but farther on it makes up for lost time by rapid and effective progress.

Finally there is the unambitious teacher; one of the kind—if such there be—who says:—"Those explanations are all well enough for persons who are sufficiently learned to understand them; but they are beyond the minds of school children. Explanations are educational luxuries, reserved for those who can go to high school and college; but as they can't be taught in the grades, I am not going to take the trouble to learn them...." There is plenty of room for difference of opinion on this point. My own conviction is that if a teacher is easy-minded about such an explanatory description as is given above, her pupils will find no difficulty in following it, particularly if she paraphrases the technical terms, suitable for herself and other adults, into simpler phrases suitable for children; and still more if her verbal explanation is accompanied by a blackboard sketch. "But I can't draw blackboard sketches...." says the reluctant teacher. That sort of a teacher—if any such there

be—probably began her first lesson in writing some years ago with the discouraged exclamation:—"I can't write," and her first lesson in singing with:—"I can't sing." Nevertheless by dint of insistent encouragement on the part of her writing and singing masters, she has probably learned to express her ideas in legible hand-writing, and to join acceptably in a four-part chorus with other voices like her own; even if she has not become a distinguished expert in chirography, or a famous *prima donna* on the operatic stage. She can just as surely, even if she never becomes a renowned artist, gain by persistence a useful dexterity in drawing blackboard diagrams, greatly to the advantage of her pupils, who will learn about land forms more easily when the observation of graphic illustrations is introduced as an aid to the study of verbal definitions and descriptions. Fortunately the eye is very ready to interpret conventional signs, and to translate a number of black lines on a flat sheet of white paper—or of white lines on a flat blackboard—into a sunlit landscape. A very moderate amount of skill is serviceable. No great perseverance is needed to show encouraging progress. Even a rough diagram is better than words alone.

The Seven Hills of Rome in the School Room. Can we not imagine an alert-minded teacher extending a lesson on Italy beyond the brief statements of a text-book, and saying, as she points in the midst of her story to a blackboard sketch:—"The broken-in volcanoes have not been in eruption for a long time, and the little streams that run down from the higher parts have worn valleys in the long gentle slopes. The valleys are arranged very much like the spokes of a wheel; they radiate rather regularly from the rim of the calderas. A river, the Tiber, that rises in the valleys among the Apennine mountains of the back country, and turns southward along the low ground between the front range and the volcanoes, has cut a shallow valley on its way to the sea across the flat saddle where the third and fourth volcanic slopes originally united. Many of the radiating valleys in the long slopes of these two volcanoes open into the main valley of the Tiber; and the ends of the long spurs between the radiating valleys form the sides of the Tiber valley. The spur ends are cut by many little valleys, so that when they are seen from the floor of the Tiber valley, they look like hills, all of about the same form, some higher, some lower. There are some 20 or 30 such hills bordering the Tiber valley, where it is worn down in the saddle between the volcanoes. The ancient city of Rome was built on a group of the hills on the south-east side of the valley; and the hills of this group are known as the 'Seven Hills of Rome.' You will read more about them some day when you study ancient history."

Geography and History. A good mental picture will be formed by pupils who hear an easy-minded teacher present such a description, while they look at its graphic equivalent on the blackboard and its loca-

tion on a wall map; and they will afterwards find such a mental picture of value whenever Rome is mentioned. Rome will no longer float around vaguely in a more or less hilly country, but will take its proper geographical position. In reply to the question:—"What is your idea of the Seven Hills of Rome?", a competent and highly esteemed university professor of history lately said to me:—"A group of seven hills rising from a plain." Another university professor of history once showed me an outline map of Europe, which he used as a base for practical exercises, and yet on which the low divide on the plains of central Russia between the north-flowing and the south-flowing rivers was represented by a caterpillar mountain range as strong as the Alps or the Caucasus. I cannot help feeling that history must lack something as long as its scenery is so vaguely conceived and so inaccurately represented; and that it will be better taught and better understood, when teachers and pupils alike, in schools and colleges, have a better knowledge of geography.

BOOK NOTICES

LEADING AMERICAN MEN OF SCIENCE. David Starr Jordan, Editor. 471 pp. 17 portraits. Henry Holt and Co., 1910. $1.75 net.

This volume is one of the "*Leading Americans*" series. *Leading American Soldiers, Leading American Novelists,* and *Leading American Essayists* have preceded it. Only the biographies of men no longer living are included. Each biography was written by "a man in some degree known as a disciple." The seventeen scientists selected are: Benjamin Thompson, Alexander Wilson, John J. Audubon, Benjamin Silliman, Joseph Henry, Louis Agassiz, Jeffries Wyman, Asa Gray, J. D. Dana, S. F. Baird, O. C. Marsh, E. D. Cope, J. W. Gibbs, Simon Newcomb, G. B. Goode, Henry A. Rowland, and W. K. Brooks.

WINSLOW'S GEOGRAPHY READERS. By I. O. Winslow. Five vols.: The Earth and Its People, 185 pp; The United States, 215 pp.; Our American Neighbors, 200 pp.; Europe, 187 pp.; Distant Countries, 194 pp. Profusely illustrated. Colored maps. Sets of test and review questions. D. C. Heath & Co., 1911. 50 cents a volume.

The author says in the preface that the books aim to select the essentials of Geography and to set them forth in an explicit and straightforward manner so that they may be used both for reading and study.

In reality, the books are a combination of text book and geographical reader. The illustrations are thoroughly good. The style is free from the "taking down" quality which mars some of our geographical readers. Emphasis is laid upon commercial and industrial matters, and a considerable history is woven in. The treatment is sane and interesting. It is not easy, however, to see how they differ much from somewhat amplified text books.

THE STUDY OF HOME GEOGRAPHY; The Geography of Worcester, Mass., by Robert Marshall Brown. 83 pp.

This is another little book along right lines. We welcome it. Mr. Brown has done the teachers of Worcester and vicinity a distinct service. Scarcely a more praiseworthy service can be done for the cause of geography than the preparation of material like this which helps teachers to interpret and utilize the home geography. Let the good work go on.

GREAT AMERICAN INDUSTRIES,—TRANSPORTATION, by W. F. Rocheleau. 263 pp. Illustrated. A. Flanagan and Co., Chicago, 1910. 60 cents.

Other volumes in the series are: Minerals, Products of the Soil, Manufactures.

A supplementary reader dealing with the development of transportation methods. It is written in a clear, interesting style and is full of valuable information.

THE WORLD'S GREAT RIVERS—THE NILE

By Professor William Libbey, D. Sc.

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THIS mighty stream, the longest of our globe, rises under the equator in Lake Victoria Nyanza, at an elevation of 3700 feet above the sea, its waters being collected from a basin some 30,000 square miles in area. It runs northward, and after passing over Ripon falls enters another basin, occupied by the Albert Nyanza lake. Both of these great lakes owe their volume of water to the enormous rain fall of the region in which they lie. After leaving this lake the river becomes navigable, and for a considerable distance its banks are heavily wooded, and thickly inhabited. Further on it flows along through 400 miles in a desert-like steppe, but brightens both banks with a strip of verdure. Then it bends eastward to the south of the Sobat, then northwest and finally to the north. In this region great stretches of the river are so densely filled with plant life temporarily as to be almost impassible, which peculiar condition is known as "the sadd." During the flood season these plants give a distinct greenish color to the water of the river as far north as Cairo.

Then for a distance of 600 miles it flows through a long and broad valley to Omdurman where it is joined by the Blue Nile which comes down from Abyssinia. The length of the White Nile to this point is 2000 miles whereas the Blue Nile is only a little over 1000 miles.

The variations in the volumes of these rivers is interesting. In March, or the period of low water for the White Nile, its volume is nearly double that of the Blue; in July, the time of high water, they are nearly equal, whereas in October, on account of the heavy rainfall of Abyssinia, the Blue Nile has often three times the volume of the White.

Below Khartum is the region of the cataracts, of which there are six between this point and Assuan. Beyond this latter place the valley has a general width of from 9 to 12 miles.

The delta begins near Cairo and extends in a straight line for a distance of a hundred miles and the total area is about 7300 square miles

The total length of the Nile is about 4000 miles and it receives no tributaries in the lower 1500 miles of its course. The difference between high or low water at Assuan is from 30 to 50 feet, at Cairo from 23 to 33 feet, and at the mouth about 3 feet.

The entire agricultural portion of Egypt extends only as far as the water of the river can be carried either by floods or irrigation. Consequently the proper management of the river, which was taken up by great Britain, has become one of the great engineering feats of our time as well as one of the greatest blessings to the people of Egypt.

The people themselves are not capable of planning any such conservation schemes, nor are they able to execute them when planned, because the mere construction of a dam would not solve the question, as so much depends upon the necessary quantity of water to do the work. Were it not for the White Nile, the quantity of water supplied by the other rivers would not suffice for the purpose, for if the heighth of the flood in the upper Nile does not reach 40 feet, drought and famine are the inevitable result.

At the time of the floods the appearance of the valley is completely changed. The delta during this period becomes transformed, the river channel disappears, and much that appeared to be solid land now (in September) disappears beneath a body of water which resembles the open sea, dotted here and there by islands where the villages are located, and the palm trees and minarets are the principal objects which indicate their existence. When the floods recede the soil is covered with a thin layer of mud and the thoroughly saturated soil, which often has a depth of 30 feet or more, retains, as a rule, sufficient water to last until harvest time.

Where artificial lifting of the water is necessary it is done by the construction of a balanced pump, composed of a long pole, to one end of which is fastened either a closely woven basket or a clay pot, by means of which the water is lifted from the river to the irrigating ditches. There are some 60,000 such pumps in the delta. In other places the work is done by cumbersome water-wheels, operated by hand or donkey power, and there are over 35,000 of these devices, which lift the blessing of the river to the thirsty land, accompanied by shrieks and groans from the ungreased joints of the apparatus. Noise may be disagreeable but in time it can be endured, for grease is expensive.

Some of the problems of the river which could be usefully employed as studies in Physical Geography are given below.

1. The contrasts between the systems of the Blue and White Nile. The one showing a more complete and advanced stage of erosion than the other.

2. The contrasts of the Plains of the Sudan, and those of lower Egypt; for their origin is quite different, and the final results of marked interest.

3. The effects produced upon the character of the river by the "ponding back" of the White Nile when the Blue Nile is in flood, the violence of its current serving as a nearly complete barrier to the other stream.

4. The cause of the cataracts. Why should the river, half way on its seaward journey become a mountain stream? Has the geological structure of the country alone determined the position, extent and nature of these barriers?

"The Nile valley as we now know it, has been the result of mighty disturbances and of peaceful erosion. Its mud-laden flood waters are the witnesses of storm and stress in the Abyssinian highlands, its summer stream a memory of the lakes of Uganda, and the delta spreading mile-wide as one vast sea of cultivation, the record of a hard-fought fight between great rivals where sea and river meet."

The most important contributions in recent time to Nile literature, are first, a book by Captain B. G. Lyons F. R. S. called "The Physiography of the Nile and its Basin," published in Cairo in 1906, and "The Nile Quest" by Sir Harry Johnston, published in London in 1903.

LABORATORY WORK IN HIGH SCHOOL GEOGRAPHY

By E. F. Bean

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PREVIOUS to the year 1893 there had been little or no laboratory work in physical geography. After the publication of the report of the Committee of Ten, which advised work of this sort, the feeling grew that physical geography, like physics and chemistry, should devote some time to laboratory work, and some schools arranged their courses in accordance with this idea. This work usually deals with the purely physical and mathematical sides of geography. The percentage of high schools which have no laboratory work is large, as is proved by the fact that out of hundreds of students who have entered the University of Wisconsin in recent years and who had studied physical geography in high school, only about 14 percent had done laboratory work in that science.

At present there is a feeling that laboratory work has not accomplished its aims, and there is a growing demand that the human element be made to supplement the purely physical side.

Exponents of the laboratory idea have been disappointed with the results of the work for it has failed in far too many cases to accomplish its aims. In the writer's judgment, the primary aims are:

1. To make clearer and to supplement the work of the recitation.
2. To study maps in such a way as, in a measure, to make up for world wide field study.
3. To gain a knowledge of regional geography which will make the students more intelligent readers of newspapers and magazines.
4. To study some of the activities of man in their relation to his environment.
5. Other incidental purposes are:

   To broaden the interest in other studies, especially history.

   To gain an acquaintance with the Unitel States topographic maps, which are the best published in this country and among the best in the world.

To learn something of common rocks and minerals.

To gain power to study pictures intelligently.

To train the students to habits of close observation.

The chief reason why the work has not met expectations is the inadequate preparation of teachers. The subject is assigned to teachers who are interested in other subjects and who therefore devote little time or energy to this subject; or, if willing to devote sufficient time and energy, do not know what to do. As a result the following are some of the elements of weakness that have developed:

1. The pupil's interest is not gained. Without the element of interest, an exercise loses much of its value.

2. The work is not thorough. So little time is spent upon a subject that careless work or hazy ideas result.

3. Work is not independent. Two or more students work together and the weaker ones go over exercises without understanding them.

4. The laboratory work does not come in proper relation to the class work. "The laboratory work ought to go hand in hand with the text book work, each supplementing the other."

5. The directions in laboratory manuals are frequently not clear. The result of this is misdirected effort and wasted time.

6. Much laboratory work is not really worth while. Careful consideration should always be given to this question, "Is this exercise worth the time it will require?"

7. In the study of topographic maps, too much attention is often paid to structure. Cross sections, showing stratigraphy, are out of place in an elementary course.

8. Too small a proportion of the time is devoted to the study of atmospheric phenomena. The causal relations between temperature and pressure, pressure and winds, winds and rainfall, rainfall and vegetation, are best brought out by carefully planned map work.

9. Too much emphasis has been placed upon the note book. It is intended merely to aid the student in giving independent expression to the ideas obtained in the laboratory and is not a theme book.

10. Too little attention is paid to the human side of geography.

In spite of the fact that laboratory work is far from satisfactory at present, every conditon can be improved without great difficulty. The materials and room are more easily secured for this than for any other laboratory science. The materials may be the maps and pictures bound in the book or illustrative material in the form of maps, charts, rocks and minerals, weather maps, etc. An elaborate equipment is not necessary. Physical maps of the continents, one twelve-inch globe, several six-inch globes, a few sets of topographic maps, and sets of a few common rocks and minerals will cover the real needs of a small school. If more money

is available, a few models, lantern slides, pictures and additional topographic maps are of benefit. The work with these materials need not be confined to a definite laboratory period, but may come during any period when their use will make the class work clearer or more telling. In the regular periods, more formal exercises may be completed. The idea that a carefully kept note book and cross section paper are necessary for a successful laboratory exercise has had something to do with the general dissatisfaction with laboratory work. A well planned oral discussion is in some cases more valuable than a written one.

It seems best to have a combination recitation room and laboratory equipped with tables and chairs. With this arrangement a part or all of a period may be employed for work with materials, the transfer of maps to and from a separate recitation room is obviated and the chances are that illustrative material will be used more often.

The report of the 1909 Committee of the National Educational Association criticises the course as at present organized, (1) because the lands are not studied from the geographic point of view, (2) because a concrete study of human response to its environment does not receive sufficient attention. In the laboratory there is a splendid opportunity to develop the human side of geography. Every map, picture and model takes on new interest when studied from this view-point. For instance, in the study of rapids and waterfalls ,the class is interested in the human response in the form of manufacturing cities. In the consideration of drainage and divides, the routes of explorers and discoverers traced upon a map will increase the interest in both geography and history. In every topographic map there is more or less of this human interest. Nearly every lesson should be enlivened by this practical, human side of geography.

The following cautions or specific suggestions may be of some value to younger teachers of the science:—

1. The work for each exercise should have a definite aim. This may be stated at the beginning of the work. At the close of the period, the class should feel that the aim is attained.

2. In planning the work, consideration should be given to the natural interests of the pupils. The teacher may determine whether an exercise is interesting by asking this question, "Would I have been interested in this when I was the age of these students?"

3. Some study of topographic maps should be made so that these maps may be used intelligently in later years.

4. If possible, the larger facts of the regional geography of the upper grammar grade should be reviewed in the light of new knowledge.

5. Commercial relationships such as railway routes, harbors and trade routes are always interesting.

See page 239 for continuation of the foregoing article.

This leaf and the one following may be removed without destroying the continuity of the text.

A STATEMENT AND A REQUEST

The next number (June) of the Journal of Geography will complete the current volume. It also brings to an end the first year of the magazine under the present management.

We are glad to report that the income has been sufficient to meet the actual money outlay necessary to carry on the magazine.

We wish most cordially to thank a few score of our good friends all the way from Boston to Los Angeles for the help they have given us. We are particularly grateful to groups of teachers in Brooklyn, Trenton, Cleveland and Indianapolis for their liberal support.

As editors and managers we have had to learn by experience. We have tried faithfully to give our readers a good magazine. We are conscious, however, that improvement is possible, and as one means of securing that improvement, we are hoping that you will be willing to fill out and send to us the blank on the opposite page. Please do this, and do it within a day or two or the little task will be pushed aside by more pressing ones and our effort will, in your case, have failed.

We want to stick to our avowed purpose, namely to appeal to teachers in the grammar, high and normal schools. We wish the material which we publish to be of two sorts.

1. *Reading matter which will help the teacher to a broader geographical knowledge, or which will keep him in touch with current thought, and*
2. *Material which may be used more or less directly in the class work.*

One teacher wrote, "I can make direct use of practically everything in the Journal." We can not hope that all of our readers have this experience. We do hope that the magazine fits in somewhere in your work and that you are finding it worth its cost and worthy of your friendship.

If you will be so kind as to answer the following inquiries, we shall doubtless be able to give you a better Journal next year than we have this year. Anyway it will be a larger magazine by at least one-quarter.

KINDLY ANSWER THE FOLLOWING INQUIRIES

1. This is the style of type and length of line (5 inches) used in the present volume. Would you prefer a slightly smaller type and shorter line? .....
2. Do you desire the continuance of the series of articles on Geographical Influences in the Development of the States? .....
3. Would you prefer to have a larger proportion of the space devoted to the pedagogical aspects of geography than has been the case this year? .....
4. Do you make any use of the sets of questions which have been printed? .....
5. Do you favor the printing of one or two pages of such questions each month? .....
6. Do you favor an occasional special number, such as the "Commercial Geography number?" .....
7. Do you favor, (say two a year) special state numbers, such as the Ohio number issued in March? Would you have more than two? .....
8. Do you prefer that, as a rule, short articles of 3 or 4 pages, or less, predominate, or do you favor longer articles? .....
9. What features of the magazine during the past year have you liked most? .....
10. What features have you liked least? .....
11. What further do you suggest for the improvement of the magazine? .....
12. May we count upon you to take the Journal another year? .....

Name .....

Address .....

6. The publications of the U. S. Geological Survey and of the geographic magazines form a splendid reference library. Special topics for reports may be assigned both as a review and as a means of giving a broader knowledge of a subject.

7. The young teacher, who has had no special training, can do no better than to use a good laboratory manual, carefully selecting exercises to meet the needs of the work.

GEOGRAPHICAL INSTRUCTION IN GERMAN ELEMENTARY SCHOOLS

By Anton Jahr

Instructor in Geography, Leipzig Schools*

WHEN I attempt, at the request which I have received, to give the readers of this magazine a presentation of geographical instruction as it is generally given in the elementary schools of Germany, I must take for granted that in Germany as in America, in England as in France, the purpose of this instruction is the same; to make the children view themselves as inhabitants of the earth and as fellow-beings with the inhabitants of other parts of the earth; to make them acquainted with the commercial relations between different countries and peoples and with the exchanges between the various countries. This is exactly the task of geographical instruction—even in the elementary schools which treat this subject in greater detail than do many higher schools, especially the Gymnasien which prepare their students for University work. The Realschules, which may be compared with the American High Schools and are intended more expressly as preparation for actual life, give a good deal of time to geography.

Concerning the elementary schools, we have in Saxony primary schools, intermediate schools and higher schools which differ principally in their organization and in the number of hours which are spent on the different branches of instruction. In my discussion, I have in mind throughout the intermediate public schools of the City of Leipzig, for which a new plan of instruction was adopted in 1908 by commissions of teachers and directors. We proceed, as you apparently do, from the known to the unknown, from the near to the far, from home to foreign lands. In all the grades, we attempt to broaden geographic ideas by the judicious use of wall and hand maps and by means of simple sketches and drawings which are made on the board by the teacher and in the notebooks by the pupils. We try to make our instruction perceptive through

*Translated by E. C. Herron, University of Wisconsin, '12.

detailed study of geographic pictures. And finally the instruction is enlivened through descriptions of countries and peoples. Thus geographical instruction will become representative instruction both for the teacher and for the pupils because this instruction has been worked over by co-operative effort, not empirically told to the pupils and given to them to commit to memory.

In regard to the question whether the political phase or the physical phase should form the principal task of geographical instruction, views have changed in recent years. Up to the middle of the 19th Century the political divisions were considered as all-important, but later the physical relations alone received attention; the political side fell into the back-ground and the stress was put upon soil, water, climatic conditions, etc. Now, however, it may be truly said that *not one* of these things should be done but *both;* hence we now consider regions not only according to physical peculiarity but also with reference to political and commercial relations.

This last mentioned point receives special attention in our geographic instruction, especially because Leipzig, through its world commerce, has international importance. Step by step our children come in contact with the produts of foreign countries; in our wholesale fur houses they see the hides of the furbearing animals of all parts of the earth; in the importing houses they see the products of India, Africa, etc.: in the factories, the cotton from the Southern States of North America and the silk from France; in the zoological garden to which they are taken twice annually, they become acquainted with the animals of all parts; in the museum of ethnology, they learn the manners and customs of the different peoples, aside from which travelling groups of strange people (Abyssinians, Indians, Hindus, Malayans, Samoans, Eskimos, etc.) give opportunity for study in their native habits. Then, too, good opportunities are offered by our "Massen," two great fairs, one in the spring and one in the fall, which bring merchants from everywhere with the wares, or samples of them, to Leipzig.

For the purpose of further explanation, I accord myself permission to go into greater detail regarding our Leipzig method of instruction and incidentally to introduce a few comments.

GEOGRAPHY IN THE LEIPZIG SCHOOLS

Our children usually enter school after the sixth year. The first two school years are of a preparatory nature; the children learn reading, writing and the fundamentals of arithmetic and receive the so-called "perception training."

THE THIRD SCHOOL YEAR. This foundation is extended in the third school year during which the knowledge of our own country (Heimatkunde) becomes an essential aim. As yet, however, history, geography and natural

history are not separated; all three are dealt with inside the bounds of the home locality; but geography, nevertheless, claims the foremost position. We study the school's environment, the school district with its public squares and streets, the most important parts of the city proper, and in a general way the suburbs and immediate vicinity of Leipzig. Thereby we reach the most simple geographic concepts such as mountain, hill, valley, lowlands, plateau, brook, river, tributary, source, mouth, etc. Along with this we draw ground plans of the school-yard, immediate vicinity of the school-district and the main part of the city. We learn, at the end of this year to interpret maps by means of coloring and signs, talk about the most striking phenomena of the weather, sunset, wind, climate, change of moon, meteors, position of the sun, the aurora, clouds, rainfall, etc. The knowledge of home conditions is further broadened by means of carefully planned little journeys which, by virtue of the many incidents and experiences met with, afford material for abundant discussion and stimulate artistic expression with pencil, brush and potters earth.

THE FOURTH SCHOOL YEAR. Natural history is now separated from geography which is taught in connection with history. We study our native country, the kingdom of Saxony, two hours a week. We naturally begin where we left off at the end of the previous year—with the surroundings of our native city and the Leipzig lowland, and reach conclusions of a general nature, for example, *the pursuits of man depend on the land on which he lives (agriculture)*, or *where people are engaged in agriculture, they do not live close together.* Then we trace our rivers to their sources, study the Vogtland and its neighboring Erzgebirge. Here much material is offered for week-long discussion on the construction of the ranges, the valleys and ridges, the forests, climatic conditions, the occupation of the inhabitants (forestry, mining, manufacturing). As we go farther east on the same journey, we consider the remaining parts of Saxony, and finally we view Saxony in its entirety. In the same manner as we built up our instruction on the materials found around our city, we now extend our knowledge through new geographical considerations. The working up of these new objects of study is reinforced by the use of wall and hand maps, by sketches, pictures and characteristic specimens of the articles manufactured in the fatherland just as the children see them at home or in the display windows of the merchants.

We regarded the "Heimatskunde" (Study of the home region) as foundational for the study of the "Vaterlandkunde" (Study of the fatherland) we consider as important above all the geography of Germany. This forms the material for the:

FIFTH SCHOOL YEAR. Now geography becomes entirely independent, history even has been separated from it. The course of study is now directed to the study of provincial domains whereby the political rela-

tions are worked out in their proper place. Going out from Leipzig once more, the children learn the region of the upper Elbe, the middle Elbe and the lower Elbe. In the center of interest stand Leipzig, Magdeburg, Berlin, Hamburg—the great industrial and commercial centers of this region. Then the Oder leads us to the Baltic and the Weser to the North Sea. We now consider collectively the North German group of states and in a similar manner South and West Germany, the Alpine region of the Rhine, ever with reference to Leipzig and the surrounding district. Then follows a survey of entire Germany with comparisons, and correlations. In this year, maps, pictures and school collections serve for illustration. Along with this we make observations of the sky and earth as before, and on little school expeditions many interesting things are learned such as disintegration by weathering, constructive and destructive work of streams, etc.

THE SIXTH SCHOOL YEAR brings us to the geography of Europe. The parts of our continent are treated according to natural regions and as parts of larger areas of land—the Alpine, Mediterranean and Western countries, the British Isles, the Northern countries, Russia, etc. We still continue to build upon the foundation which we have gained in the earlier years. We fix firmly in the minds of the pupils, the natural conditions under which the civilization of each country must necessarily develop. We endeavor to imprint the relation which Germany, Saxony and Leipzig sustain to the various countries of Europe. We trace the European highways of trade which serve the commerce of Leipzig. The great number of foreigners who come to the fairs and the University students enable the children to hear foreign tongues, and we teach them about the great root-languages, Indo-Germanic and Semitic, and enable them to distinguish between the Slavic, Romantic and Tuetonic languages. It is needless for me to say that in this year as previously, the instruction is enlivened by the use of maps and pictures, and that the children reproduce what they have learned in little essays and sketches. We continue our observation of phenomena of weather and sky; the children are taught to observe the thermometer and barometer, and learn to follow the relation betwen wind and weather.

THE SEVENTH SCHOOL YEAR brings the study of geography to a close, inasmuch as it treats of *all* parts of the earth. At the outset, we give the children a general acquaintance with the earth-sphere. They now learn about the North and South pole, equator and tropics, longitude and latitude, globe, planisphere, and the method of locating places on the map by means of these lines. Proceeding from the parallel and meridian of Leipzig, they are drilled is ascertaining the geographical position of Saxony, Germany, and the rest of the European countries. Then they receive a general view of the distribution of land and water on the earth's surface

from maps in the atlas and thus become familiar with the great oceans and continents.

After these introductory steps, we take up with special reference to their meaning for us, the countries outside of Europe and the conditions of civilization peculiar to them. Of course, in our discussion, the emphasis is put upon the most important countries. We lay great stress on truths of a general nature, such as the importance of mountains and plains; differences between continental and oceanic climates; distribution of heat on the earth; rivers and ocean currents; changes on the earth's crust by wind, water, weather and volcanoes; the part played by the different forces in shaping the earth's crust; and the cause of the location of the great commercial centers and trade-routes.

THE EIGHTH SCHOOL YEAR treats geography with intense concentration on "Heimatkunde" (Knowledge of one's native country). We speak once more of our native city, its location and its growth from a small Slavic fishers' village to a great commercial and industrial city, of our world commerce, industrial importance and intercourse, of science and art, and of the institutions of public safety and city management. Once more we take up the geography of Saxony and Germany in order to review it thoroughly and, aided by the more mature intellects of the children, to enter into greater detail. We now place the study of "culture geography" in the foreground; discuss advantages and disadvantages of political boundaries, density of population, emigration and immigration, races of people, the different religions, agriculture and the occupations most closely related to it, the forests and their economic importance, conservation of the soil and its influence on economic life, the relations between manufacturing, agriculture and commerce, methods of transportation, the German Colonies, the Confederation of German States and the Constitutions of Saxony and the German Empire.

In final conclusions, we view man in his dependence on the soil and climate, plants and animals, and also as the creator of civilization. Lastly, in mathematical geography we take up the solar system and the yearly and monthly phenomena in the sky and on the earth, thereby giving a view of the construction and constitution of the universe. In addition to the study of the sky, the children get acquainted with the weather charts and the forecasts which appear in the daily papers, and are taught to note the changes of the weather from day to day.

At this stage, we are able to make a great correlation of all branches of learning—history, geography, natural history, physics, chemistry, mathematics and German, *for knowledge has educational value only when its connection and relation to the great problems of life are realized and no other subject offers such possibilities in this line as geography.*

THE ASSOCIATION OF AMERICAN GEOGRAPHERS

The seventh annual meeting was held at Pittsburg, December 29-31, 1910, under the presidency of Dr. H. C. Cowles of the University of Chicago. Public lectures were given by Professor Mark Jefferson and by Dr. Cowles. Professor Rollin D. Salisbury conducted a round table conference on the "Purposes of Geographical Instruction, and the phases of the subject best adapted to these purposes".

The following officers were elected; President, Professor Ralph S. Tarr, Cornell University; First Vice President, Alfred H. Brooks, U. S. Geological Survey; Second Vice President, Henry G. Bryant, President of the Geographical Society of Philadelphia; Secretary, A. P. Brigham, Colgate University; Treasurer, Professor N. M. Fenneman, University of Cincinnati; Councillor for three years, Professor Herbert E. Gregory, Yale University.

The following were appointed as delegates to the Geographical Congress to be held in Rome in October, 1911: Cyrus C. Adams, A. P. Brigham, H. C. Cowles, W. M. Davis, H. W. Fairbanks and Ralph S. Tarr.

The Association has voted to establish a publication, and has appointed the following Publication Committee: Richard E. Dodge, Chairman and Editor, Alfred H. Brooks. Henry C. Cowles and Ralph S. Tarr.

Following the discussions of the round table conference the Association adopted the resolutions herewith appended.

"The Association of American Geographers at its Pittsburg meeting, December 29-31, discussed the present status of Physical Geography in secondary education and passed the following resolutions:

Resolved, that in the opinion of this Association Physical Geography fully deserves to retain a place in the High School.

That the disappointment or dissatisfaction sometimes expressed regarding the results of teaching this subject is in large measure due to inefficient teaching.

That as a means of removing this dissatisfaction, superintendents and principals are urged to procure teachers of physical geography adequately prepared in their subject, and to entrust the subject only to such teachers.

That no teacher of physical geography should be appointed in any educational grade who has not made serious and special study of the subject in a higher educational grade."

A committee on state educational bulletins was appointed to report at the next meeting: N. M. Fenneman, Chairman, W. M. Davis and R. H. Whitbeck.

The next meeting will be held in Washington in connection with the American Association for the Advancement of Science.

ALBERT PERRY BRIGHAM, *Secretary.*

QUESTIONS ON AFRICA

By David Olson

State Normal School, Stevens Point, Wis.

1. Compare the position of Africa with that of South America.
2. How is the surface of Africa as a whole unlike that of the other continents? Which continent most nearly resembles it as to surface?
3. What rivers of Africa and South America have basins with similar position, climate and vegetation? Which is larger?
4. Compare the climates of Northeast Africa and Northeast South America. How are they unlike? Why?
5. Which continent has more arid land—Africa or South America? Why?
6. Why is there so large a desert area in northern Africa? What is its area?
7. What is a savanna? Where are the savanna belts of Africa? Why?
8. What animals of Africa are characteristic of the savanna belts? Why?
9. Where are the Tropical Forests of Africa? What African animals live in the forest?
10. What deserts of Africa and South America have a similar position and are due to the same causes?
11. What part of Africa has a rainfall comparable to that of the monsoon area of Asia?
12. What has prevented the large rivers of Africa from serving as easy means of transportation? To what extent have the difficulties been overcome?
13. What are the most striking features of the Nile River? Which of these does it possess in common with the Mississippi River? The St. Lawrence? The Colorado? The Amazon?
14. When do the floods of the Nile occur? Why?
15. What conditions favored the early growth of civilization in Egypt?
16. What is the size and purpose of the Assuan dam? Have any such enterprises been developed in this country? Where?
17. What is an oasis? What is the source of the water?
18. To what extent do oases determine the distribution of vegetation, population and villages in North Africa?
19. To what extent is Irrigation now carried on in Africa? Can it be developed as far as in the United States?
20. Why was Africa explored and settled so much later than North or South America?
21. What nations now hold territory in Africa? Which have the largest influence in the development of Africa?

22. How are these African holdings of European countries governed? Of what advantage are they to the home countries?
23. Has the partition of Africa been an advantage or a disadvantage to the native races?
24. What section of the continent is most developed? Why?
25. Why are the French building good roads through and across the Sahara region?
26. How do the products of the Kongo Basin compare with those of the Amazon Basin?
27. With what products does Africa compete with the United States in the markets of Europe? From what districts in each continent do these products come and to what extent are the conditions similar?
28. To what extent does the United States carry on commerce with African countries and what are the leading exports and imports?
29. What has been the influence of the Suez Canal in history and in the commerce of the present?

ASTRONOMICAL GEOGRAPHY TAUGHT FROM THE GLOBE

By Wm. T. Skilling

State Normal School, San Diego, Cal.

Following are some interesting facts which may be very simply demonstrated from an ordinary school-room globe.

1. The direction in which the sun sets or rises any day in the year.
2. The length of any day in the year.
3. The length of day in any latitude.
4. That in all latitudes the days and nights are each twelve hours long when the sun is over the Equator March 21st and Sept. 23rd.
5. That the days on the Equator are twelve hours long throughout the year.
6. The reason why, within the polar circles, there is a day each year of more than twenty-four hours in length without darkness, and a night of equal length without a sunrise.
7. Why the nights and days are each six months long at the poles—and nowhere else.

ASSUMPTION:

The principle upon which all the demonstrations are based is that we can see the sun one quarter of the distance around the earth in any direction. Beyond that it is below the horizon. This fact can be easily shown to a class by means of a diagram.

METHOD:

1. Tie two knots in a string just far enough apart to reach one-quarter the distance around the globe—from the pole to the Equator, for example. Place one knot on the globe at the observer's location. Find from the analemma printed upon the globe how far north or south of the Equator the sun is upon the particular day. Then place the other knot in this latitude and, keeping it the same distance from the Equator all the while, run it along to the east or west until the string is stretched. This will be the point of sunrise or sunset, and the direction the string takes as it leaves the observer's station is the direction in which he may see the sun rise or set upon that day.

2. The length of the day is found by counting the hour circles (the meridian lines 15° apart on the globe) between the points of sunrise and sunset. On the 21st of June and the 22nd of December it will be found that the days are longest and shortest, respectively, of any time in the year.

3. Placing the first knot at various points (of different latitude) and following the same method, it will be seen that the higher the latitude, the greater the difference in length between night and day.

4. In whatever latitude one knot is placed the other can be run along the Equator just the space of twelve hour circles, showing that at the equinoxes the days and nights are equal everywhere.

5. Placing the stationary knot on the Equator and following the apparent path of the sun along any parallel of latitude, the string will be found to reach over just 180° of this parallel or across twelve hour circles, showing that to people on the Equator, all days are twelve hours.

6 and 7. The polar nights are studied by placing the stationary knot, representing the observer, within the polar circle. It will then be found that the string will not reach quite to the Tropic of Capricorn, even when stretched straight off to the south—the nearest direction. From this fact it is seen that when the sun is over the Tropic of Capricorn, it is not visible to a person within the Arctic Zone, even at twelve o'clock, when it is nearly up to the horizon.

Thus the sun does not completely rise for a period, depending, as may be demonstrated, upon the distance the observer is from the arctic circle. The nearer the pole he approaches, the longer becomes the night until, upon reaching the pole, it is six months long—the total time that the sun is south of the Equator. This is shown by placing one knot on the pole of the globe, when the other will be seen just to reach the Equator in any direction. That is, beyond the Equator where the sun remains for six months, it cannot be seen at all.

THE USE OF OUTLINE WALL MAPS

By W. M. Gregory

Normal School, Cleveland, Ohio

THE practical use of the map is essential in elementary geography for it renders concrete the distribution of various geographic facts and provides a basis for the interpretation of relationships. The elementary class room requires large wall maps which clearly delineate the facts of the daily lesson. Studies of the world distribution of rainfall are far more effective when the rainfall regions are graphically displayed upon a large wall map before the class. Large maps of the rainfall, vegetation etc. are now published for each continent but are too expensive to provide an adequate supply for the grades and they often have more of the details than is suitable for the elementary school.

There is published a series of outline wall maps* which are excellent for the plotting and display of geographical data for class use. These maps, having only the main features, are printed without names in non-lustrous ink on heavy manilla paper. Maps of this size (32 in. by 48 in.) afford an opportunity to graphically display the winds, rainfall, vegetation and distribution of population of a country, continent or the world. Such facts can be shown by waterproof inks, water-colors, crayons or pastel. Red and black are very satisfactory for important contrasts and may be used solid, in dashes, dots, bars, etc. The various sizes of sign ruling pens and the camel's hair brush are best adapted for using the inks and water-colors. Crayons can be permanently fixed by some shellac fixative. The few essential names are inserted by a sign printing outfit. If a series of these maps are made as suggested below, each series should be mounted on a single roller, then there is less wear and loss than when the maps are unmounted and unrolled. Two half-round red gum rods screwed together form a more satisfactory mounting than the usual single mapstick with tape backing. Heavy tape suspension loops are placed near the ends of the rods to allow the turning of the maps while hanging. A more expensive method of mounting these maps consists in cutting them into sections and backing with cloth so that each one will fold readily into a portfolio of convenient size.

The adaptation of data for display upon a large wall map needs careful consideration as to its practical use in the school. The small details must be merged into the larger features of distribution and the completed map must convey a concrete idea of the geographic relationships of the topics involved. For example an accurate map of the corn production per square mile in the United States can be obtained from plate No. 154 of the Statistical Atlas of the Twelfth Census, but it is difficult

*The McKinley Publishing Company, Philadelphia, Pa.

to reproduce, and is not suitable for the elementary school. The data can be adapted to illustrate the primary and secondary regions of corn production, the large packing house cities. A map thus prepared forms an excellent basis for the elementary study of this topic.

A series upon United States might comprise ten maps showing rainfall, temperature, wheat, corn, iron, coal, forests, cotton, political and physical regions. The North America group could include rainfall, winds, temperature, regions of vegetation, distribution of population, the great cities and political divisions. A world series might very profitably include the same topics with the addition of lines of trade and commerce. There are many sources of material which can be readily utilized for the construction of wall maps. The text-book in geography frequently provides a good map for enlarging, but some of the other sources cited below should be used for correction and verification.

In the preparation of a world series a booklet on World Diagrams by Mark Jefferson gives some excellent small maps which are accompanied by sets of suggestive questions. A series of small booklets by D. C. Ridgley are without the maps, but are valuable in the elemenatry study of climate, vegetation and population. The Atlas of Meteorology by Bartholomew will supply any details of climate which one may wish to add. Berghaus' Physikalischer Atlas, Parts VI and VII, provides material for the regions of vegetation and the distribution of population. The small School Economic Atlas by Bartholomew is excellent for commercial relations and trade routes. In Geographical Diagrams by Snape are diagrams of the climatic regions of continents and plans for graphically showing exports and imports. Likewise Supan's *Die Verteilung des Niederschlags auf der festen Erdoberflaeche* for rainfall and vegetation.

For a series to illustrate the important geographical facts of the United States the above references would furnish much of the climatic data. The publications of the Weather Bureau should be utilized in constructing the rainfall and temperature maps. The wheat regions could be shown by adapting Plate 156 from the Statistical Atlas of the Twelfth Census. The winter, spring and durum wheat regions, as well as the great wheat shipping cities and the flour milling centers, should be clearly lettered. In one corner of the map a diagramatic representation, similar to Plate 163 in the Statistical Atlas, of the total production and that of each state, would place the essential facts before the class. The iron and coal resources are combined and shown upon one map of the United States. The bituminous, anthracite and lignite region are given different colors and the data taken from Plate I of the Mining Resources for 1907.

These suggestions might still further be elaborated but the few examples cited may aid in bringing the map into greater practical use in the daily recitation in geography.

SUMMER SCHOOL COURSES IN GEOGRAPHY

The following is an incomplete list of universities giving summer courses in geography. We have not succeeded up to date in securing the necessary information from all of the universities to which we wrote, and some may have been overlooked in our inquiries. Many normal schools and normal colleges are offering summer courses.

University of Chicago

PHYSIOGRAPHY, including field trips on certain Saturdays, Major study. Prof. Salisbury and Mr. Schockel.

CONTINENTAL EVOLUTION. Primarily for teachers of physiography and geology. Major study. Prof. Salisbury and Mr. Donnelly.

TEACHERS' COURSE. For teachers of physiography in secondary schools. Minor study, first term. Prof. Salisbury.

COMMERCIAL GEOGRAPHY. Major study. Mr. Finch.

INFLUENCE OF GEOGRAPHY ON AMERICAN HISTORY. Major study. Professor Barrows.

POLITICAL GEOGRAPHY. Major study. Professor Tower.

THE NATURAL RESOURCES OF THE UNITED STATES: THEIR EXPLOITATION AND CONSERVATION. Major study. Professor Barrows.

RESEARCH COURSE. Advanced work. Professors Salisbury, Barrows and Tower.

The school of Education of Chicago University offers courses in:

GEOGRAPHY IN THE PRIMARY GRADES, GEOGRAPHY IN THE GRAMMAR GRADES, and GEOGRAPHY IN THE HIGH SCHOOL, byAssociate Professor Baber.

Columbia University, New York, N. Y.

COMMERCIAL AND INDUSTRIAL GEOGRAPHY. Lectures, discussions and reference works. Two points credit. Professor Calkins.

THE TEACHING OF GEOGRAPHY. Lectures and discussions. For teachers in both elementary and secondary schools. Two points credit. Professor Calkins.

A 3-weeks' course in the teaching of elementary geography will also be given by Professor Calkins.

Cornell University, Ithaca, N. Y.

A. PHYSICAL GEOGRAPHY. Lecture Course; four hours a week. Two hours credit. Professor G. E. Condra and Mr. von Engeln.

B. PHYSICAL GEOGRAPHY. Laboratory course; one section of the class will take the work for university credit; the other section will be made up of teachers who do not desire credit. Two two-hour periods a week; one hour credit. Mr. von Engeln and Mr. Filmer.

C. PHYSICAL GEOGRAPHY. Field course. One afternoon each week, three Saturday excursions and two or three two-day voluntary excursions. One hour credit.

D. METEOROLOGY AND CLIMATOLOGY. Lectures, laboratory work and field observations. Three lectures; one afternoon laboratory period. Two hours credit. Dr. W. M. Wilson.

E. GEOGRAPHY OF NORTH AMERICA. Four lectures and some laboratory and library work each week. Two hours credit. Mr. von Engeln and Professor Condra.

F. INDUSTRIAL GEOGRAPHY. Four lectures, library and museum work each week. Two hours credit. Professor Condra.

ROUND TABLE CONFERENCE IN GEOGRAPHY. Four or five evening-conferences on the teaching of geography. Voluntary.

The University of Michigan, Ann Arbor.

TEACHERS' COURSE IN PHYSIOGRAPHY. Lectures, laboratory work and recitations. Four times a week. Two hours credit. Prof. Calhoun and Mr. Perkins.

A course in Glacial Geology with field excursions may also be taken.

The University of Missouri, Columbia.

GEOGRAPHY OF THE UNITED STATES. Five times a week. Mr. F. V. Emerson.

PHYSICAL GEOGRAPHY. Suited to those who desire to teach the subject in high schools or who wish a preparation for more advanced work. Field excursions. Five times a week. Mr. Emerson.

PRESENT DAY GEOGRAPHIC PROBLEMS. Presupposes a thorough knowledge of Physical Geography. Hours and credit to be arranged. Mr. Emerson.

New York University.

GEOGRAPHY. Deals with advanced phases of physical, commercial and political geography; for teachers. Lecture course, 30 hours. Professor Woodman.

THE GEOGRAPHY OF COMMERCE AND INDUSTRY. Covers the various countries of the world. Lecture course, 60 hours. Professor Woodman.

GENERAL PHYSIOGRAPHY AND GEOLOGY. Discussions, reports and field excursions. Field course, counts as a 60-hour lecture course. Professor Woodman.

The Ohio State University, Columbus, Ohio.

PHYSIOGRAPHY. Three hours credit. Field excursions certain Monday afternoons and Saturdays. Of special value to high school teachers. May be used for ½ unit entrance credit. Prof. George D. Hubbard.

ADVANCED PHYSIOGRAPHY. For advanced undergraduates and graduates. Three to five credit hours. Prof. Geo. D. Hubbard.

The University of Pennsylvania, Philadelphia.

COMMERCIAL GEOGRAPHY OF THE UNITED STATES. A study of the products and industries of the United States. Visits to factories and wharves. Three lectures and one trip a week. One unit credit. Mr. George B. Roorbach.

POLITICAL GEOGRAPHY. Deals with the important features of the principal countries of the world. Daily. One unit credit. Mr. Roorbach.

PHYSICAL GEOGRAPHY. Lectures and field excursions. One unit credit. Mr. Roorbach.

Summer School of the South. University of Tennessee, Knoxville.

Eight courses in Geography and Geology are offered by Dr. F. A. Millidge, Virginia State Normal School; Dr. John Thom. Holdsworth, University of Pittsburg, and Professor Royal P. Jarvis, University of Tennessee. The courses in Geography offered are:

1. Physical Geography.
2. Descriptive Geography.
3. Geography of the Continents.
4. Commercial and Industrial Geography of the United States.
5. Commercial and Industrial Geography of Foreign Countries.

The University of Virginia, Charlottesville.

PHYSICAL GEOGRAPHY. Lectures, recitations and map studies. Daily. Helpful for teachers. Prof. Frank Carney and Mr. Scheffel.

GEOGRAPHIC INFLUENCES. Lecture and recitation course designed for teachers and college students. Five times a week. Prof. Carney.

PRIMARY AND GRAMMAR SCHOOL GEOGRAPHY. For teachers. Also prepares for state examination for first grade certificate. Daily. Prof. Carney.

University of Wisconsin, Madison.

PHYSICAL GEOGRAPHY FOR HIGH SCHOOL TEACHERS. Five lectures and one field trip a week. Two hours credit. Mr. Wm. M. Gregory.

COMMERCIAL GEOGRAPHY of the leading commercial nations. Five lectures a week. Assigned readings. Two hours credit. Professor R. H. Whitbeck.

FIELD AND LABORATORY COURSE IN PHYSICAL GEOGRAPHY. Five afternoon excursions; four Saturday excursions. Two 2-hour laboratory periods a week. Two hours credit. The field work may be taken alone for one hour credit or the laboratory work alone for one hour credit. Professor Whitbeck and Mr. Gregory.